

Is sedentary behavior associated with dysglycemia in youth with obesity?

Alan Alvarez de Sotomayor¹, BS, Hala El-Mikati², MD, Lisa Yazel-Smith², MS, MCHES, Tamara Hannon², MD, MS

¹Indiana University School of Medicine, ²Indiana University School of Medicine, Department of Pediatrics, Pediatric and Adolescent Comparative Effectiveness Research

Background and Hypothesis: The childhood obesity epidemic is linked with an increase in dysglycemia and type 2 diabetes (T2D) amongst youth.ⁱ Adolescence is associated with decreased levels of physical activityⁱⁱ, however, there is a paucity of research investigating physical activity measures and dysglycemia in youth. We hypothesize that decreased physical activity and/or increased sitting time is positively correlated with dysglycemia.

Project Methods: Study participants were youth aged 10-21y with a BMI >85th percentile for age and gender. Accelerometers (activPAL) and the FELS Physical Activity Questionnaire (FELS PAQ) were used to assess objective and self-reported physical activity levels. Glucose tolerance was assessed with 2-hour oral glucose tolerance tests (OGTT). Independent t-tests were used to compare physical activity levels for participants with normal glucose tolerance (NGT) and dysglycemia. Correlation analysis was performed to evaluate relationships between measures of physical activity and OGTT measures.

Results: Participants with NGT (N=27) and dysglycemia (N=26) had comparable demographics; age, race, and ethnicity. Hemoglobin A1c (HbA1c) ($p=0.002$), average fasting glucose ($p<0.00$), indices of insulin resistance (HOMA-IR) ($p=.023$), insulin secretion (disposition index, DI, a marker of risk for T2D) ($p=.008$), 2-hour-OGTT measures for glucose ($p=.004$) and insulin ($p=.002$) differed between groups. There were not group differences for objective or self-reported measures of physical activity. For the entire cohort, sitting time was positively associated with OGTT 2hr glucose ($r=.38$, $p=.03$). However, a subgroup analysis showed that the association between sitting time and OGTT 2hr glucose was significant in the dysglycemia group only ($r=.64$, $p=.006$, vs $r=.016$, $p=.95$ for NGT group). Self-reported measures of activity (Likert scores) and OGTT measures for insulin and glucose were positively correlated.

Conclusion and Potential Impact: Increased sitting time is associated with impaired glucose tolerance in youth with obesity at risk for T2D.

ⁱ Van der Aa MP, Fazeli Farsani S, Knibbe CA, de Boer A, van der Vorst MM. Population-Based Studies on the Epidemiology of Insulin Resistance in Children. *J Diabetes Res*. 2015;2015:362375.

ⁱⁱDumith SC, Gigante DP, Domingues MR, Kohl HW. Physical activity change during adolescence: a systematic review and a pooled analysis. *International Journal of Epidemiology*. 2011;40(3):685-98.